FIG.1

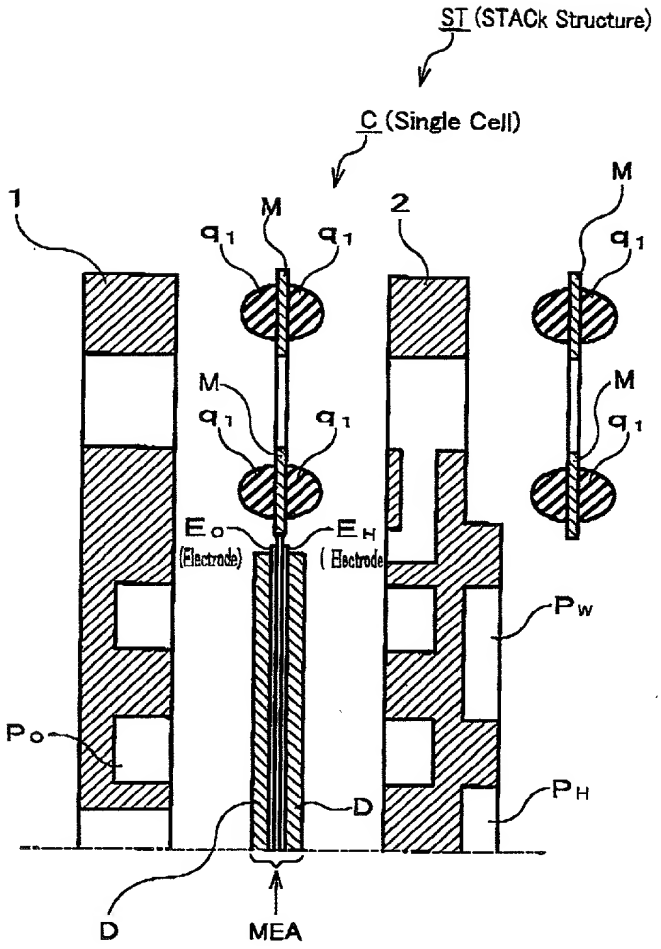

ST (STACk Structure)
C (Single Cell)
1
2
M
q1
EO
(Electrode)
EH
(Electrode)
PW
PO
PH
D
MEA

FIG.2

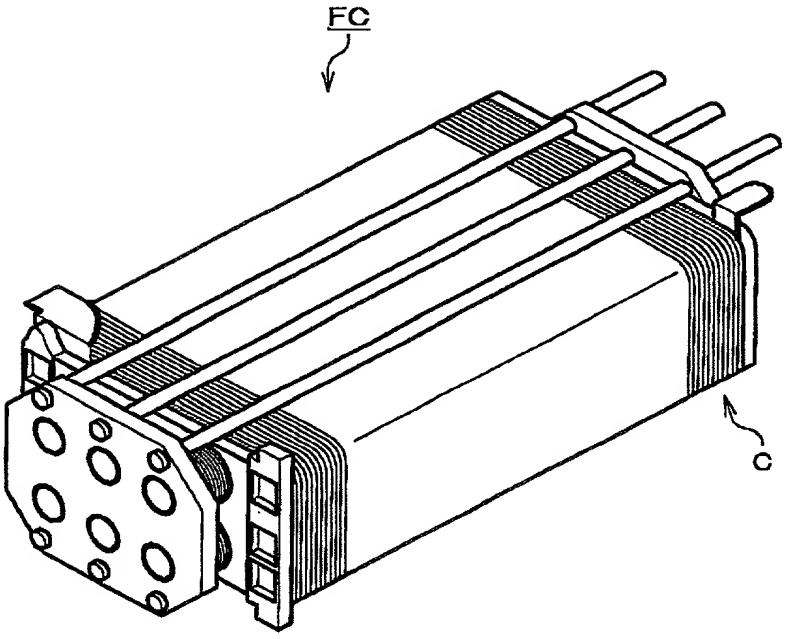


FIG.3

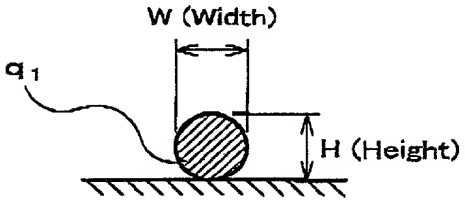


FIG.4

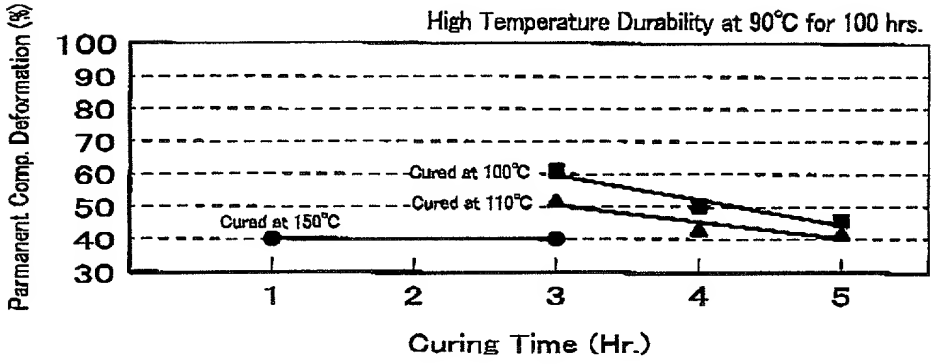


FIG.5

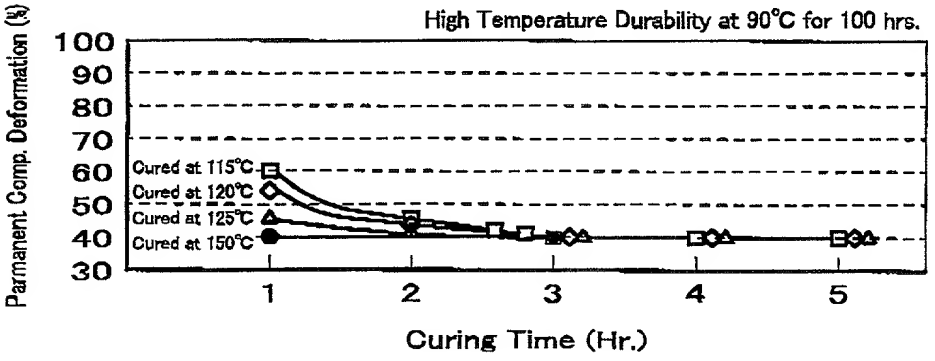


FIG.6

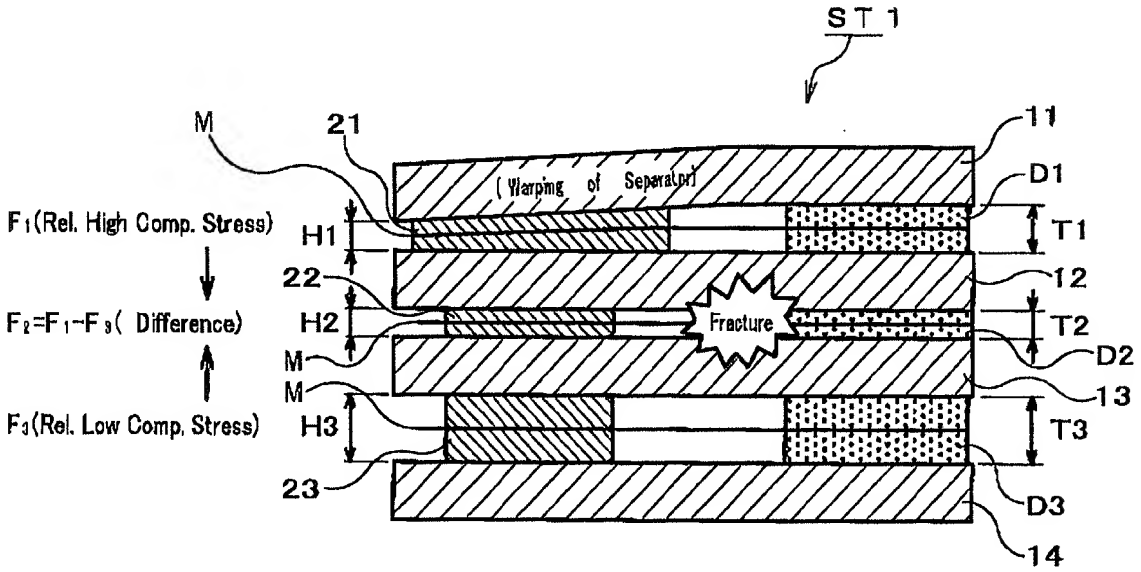

ST 1
M
21
11
(Warping of Separator)
D1
F1(Rel. High Comp. Stress)
H1
T1
22
12
F2=F1-F3(Difference)
H2
Fracture
T2
M
D2
M
13
F3(Rel. Low Comp. Stress)
H3
T3
23
D3
14

FIG.7

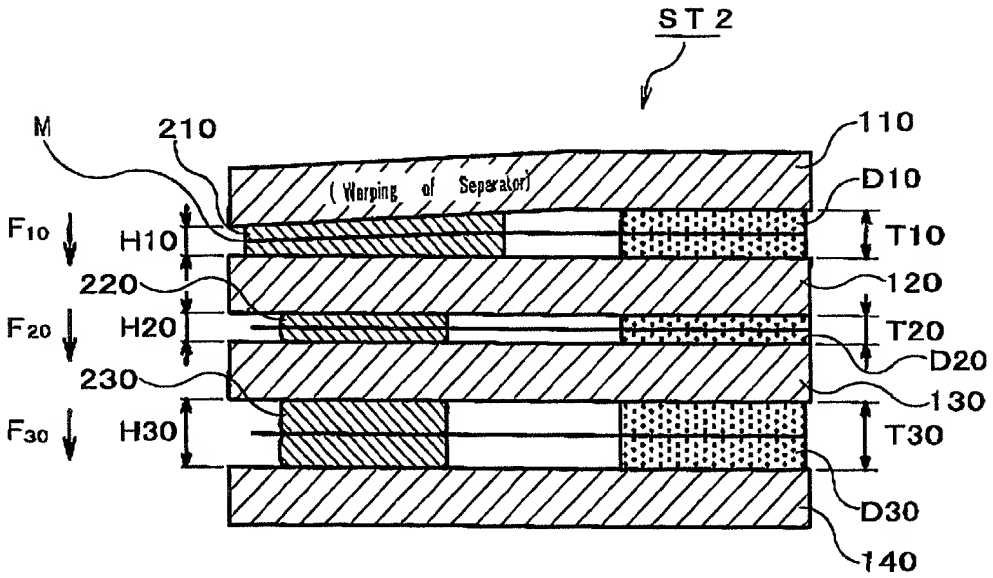

ST 2
M
210
110
(Warping of Separator)
D10
F10
H10
T10
220
120
F20
H20
T20
D20
230
130
F30
H30
T30
D30
140

FIG.8

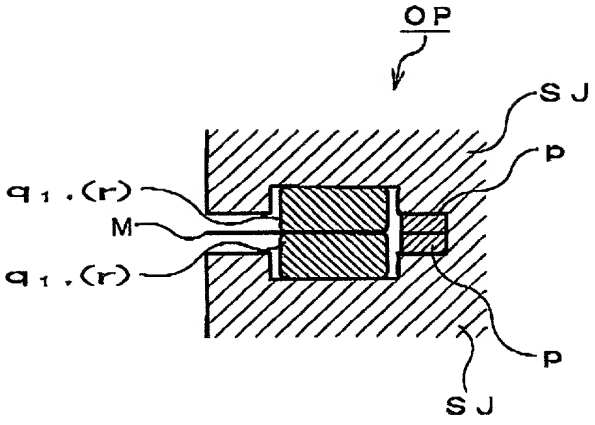

OP
SJ
P
q1.(r)
M
q1.(r)
P
SJ

FIG.9

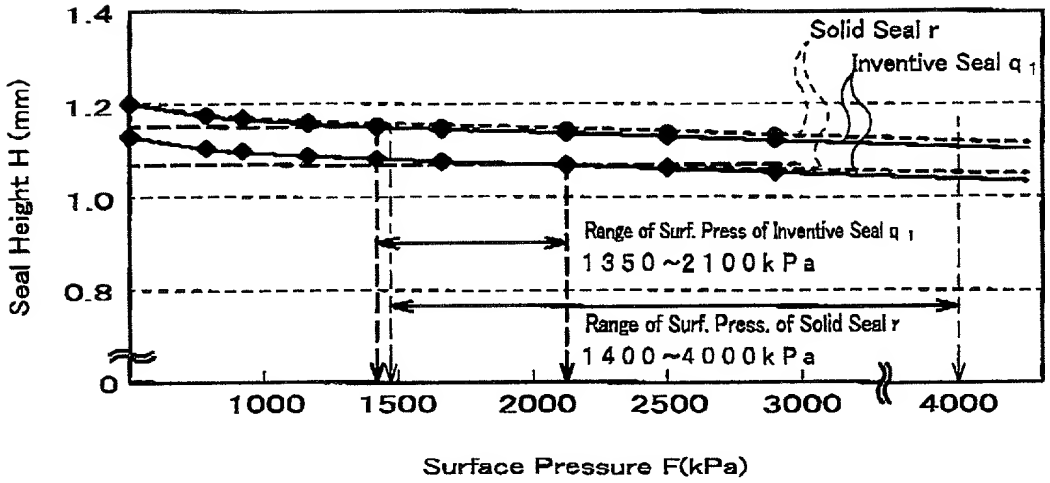

1.4
1.2
1.0
0.8
0
Seal Height H (mm)
Solid Seal r
Inventive Seal q1
Range of Surf. Press of Inventive Seal q1
1350~2100kPa
Range of Surf. Press. of Solid Seal r
1400~4000kPa
1000
1500
2000
2500
3000
4000
Surface Pressure F(kPa)

FIG.10

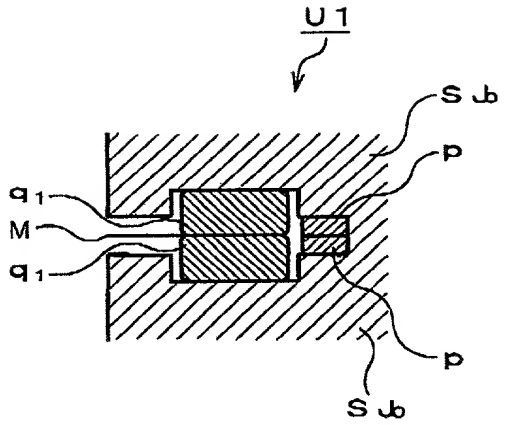

U1
SJb
p
q1
M
q1
p
SJb

FIG.11

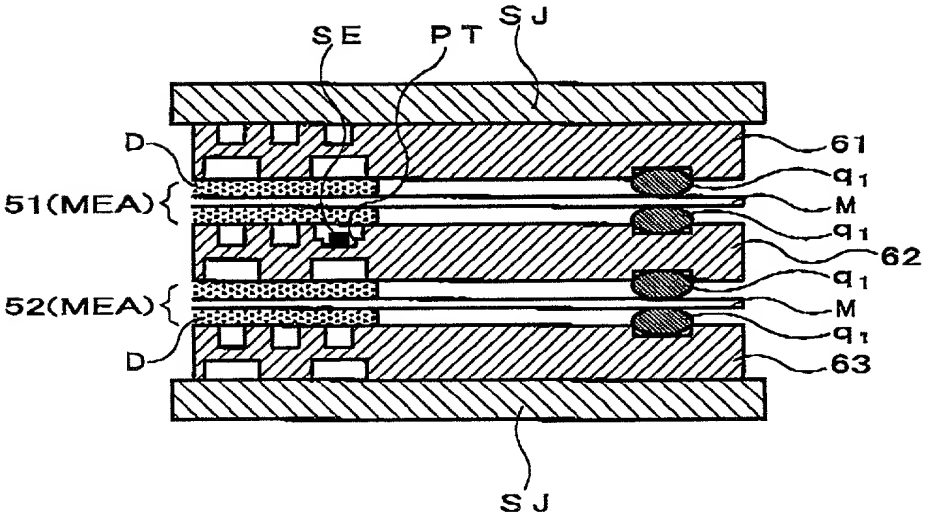

SE
PT
SJ
D
51(MEA)
52(MEA)
D
61
q1
M
q1
62
q1
M
q1
63
SJ

FIG.12

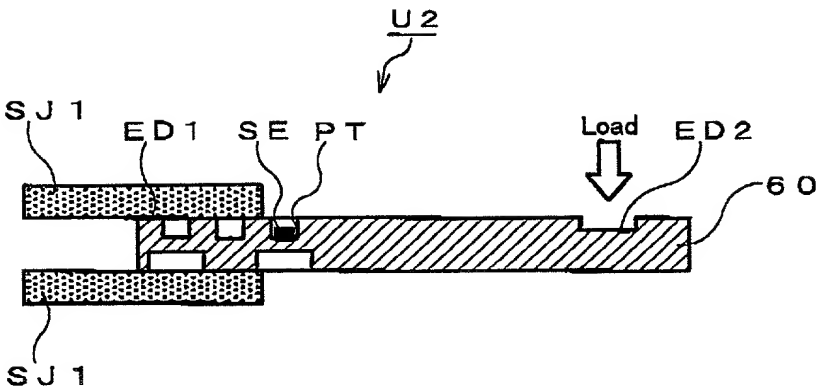


FIG.13

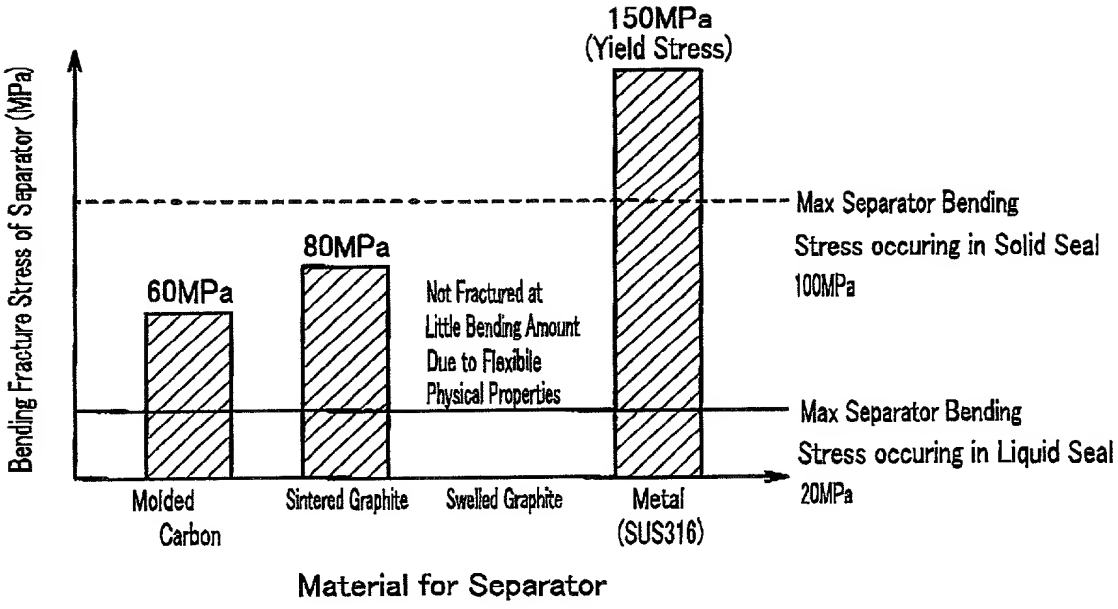

150MPa
(Yield Stress)
Bending Fracture Stress of Separator (MPa)
Max Separator Bending
Stress occuring in Solid Seal
100MPa
80MPa
60MPa
Not Fractured at
Little Bending Amount
Due to Flexibile
Physical Properties
Max Separator Bending
Stress occuring in Liquid Seal
20MPa
Molded
Carbon
Sintered Graphite
Swelled Graphite
Metal
(SUS316)
Material for Separator

FIG.14

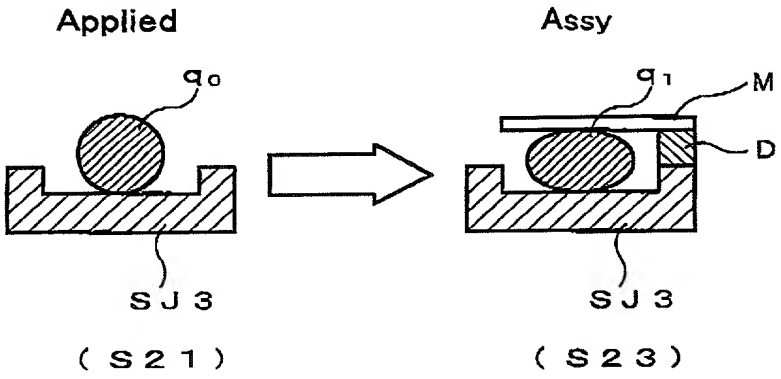

Applied
Assy
q_0
q_1
M
D
SJ3
SJ3
(S21)
(S23)

FIG.15

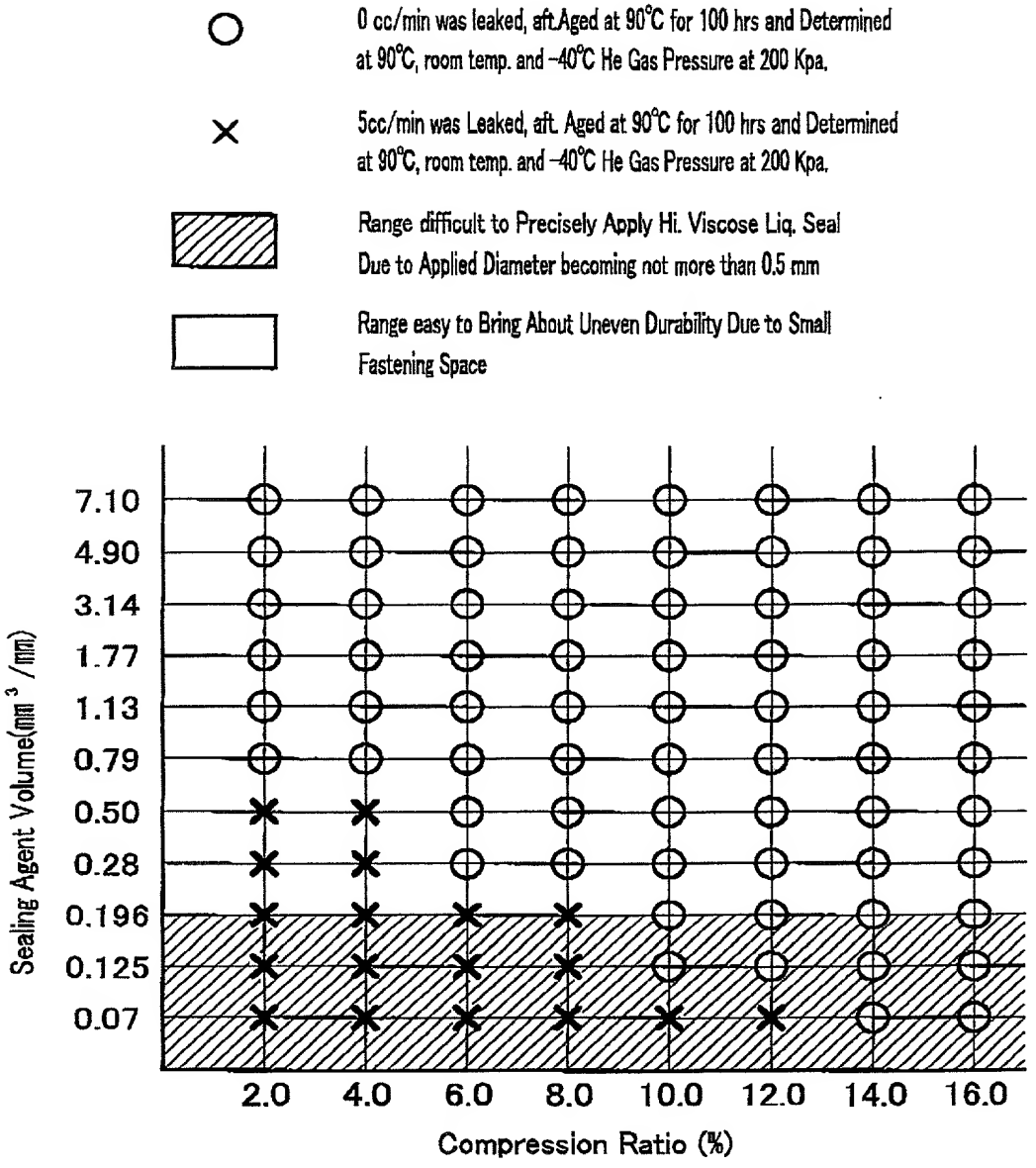
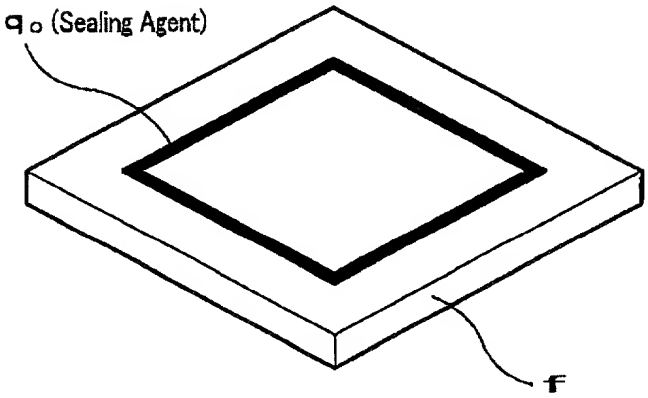
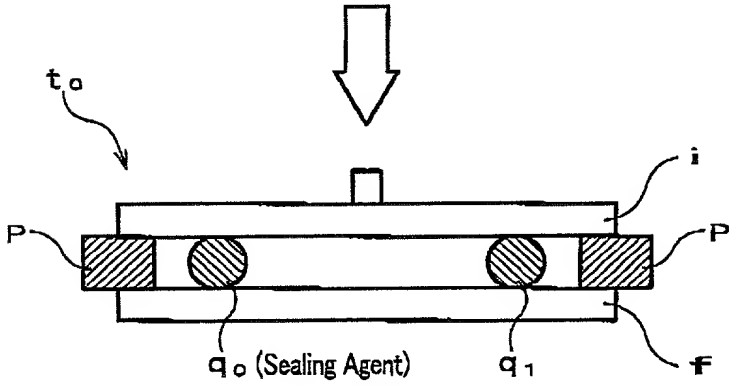

○
0 cc/min was leaked, aft.Aged at 90°C for 100 hrs and Determined at 90°C, room temp. and -40°C He Gas Pressure at 200 Kpa.
×
5cc/min was Leaked, aft. Aged at 90°C for 100 hrs and Determined at 90°C, room temp. and -40°C He Gas Pressure at 200 Kpa.
Range difficult to Precisely Apply Hi. Viscose Liq. Seal Due to Applied Diameter becoming not more than 0.5 mm
Range easy to Bring About Uneven Durability Due to Small Fastening Space
Sealing Agent Volume(mm³/mm)
7.10
4.90
3.14
1.77
1.13
0.79
0.50
0.28
0.196
0.125
0.07
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
Compression Ratio (%)

FIG.16

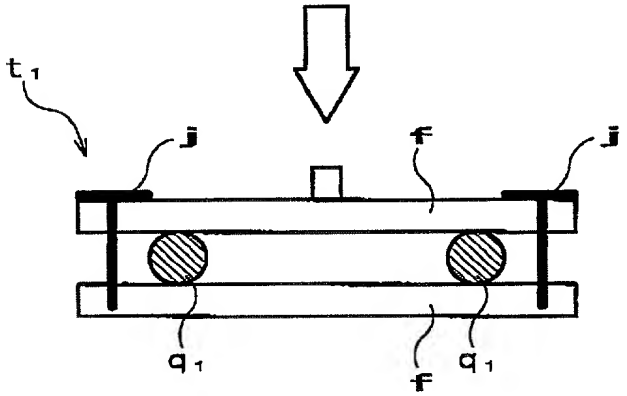


(S1)

f ; 500×500×5mm
q_o ; Sealing Agent (Applied 400×400mm)

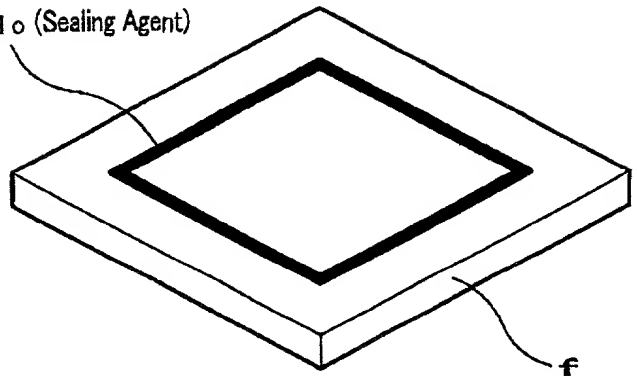


(S2)



(S3)

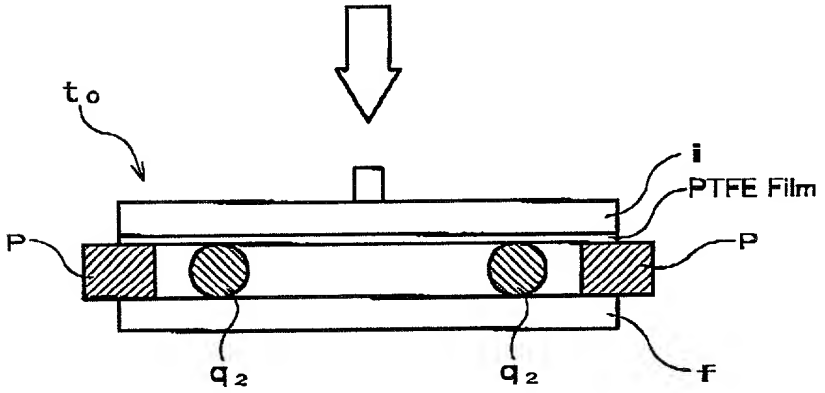
FIG.17



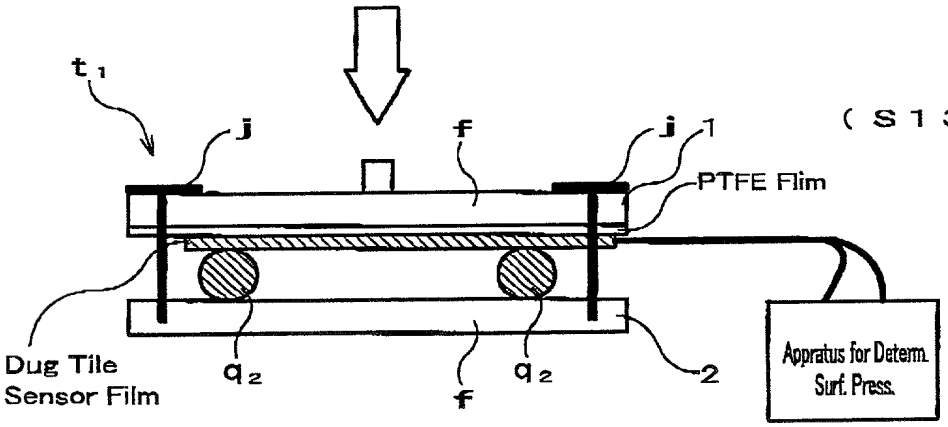
(S 1 1)

f ; 500 × 500 × 5mm

q o ; Sealing Agent (Applied to 400 × 400mm)



(S 1 2)



(S 1 3)

FIG.18

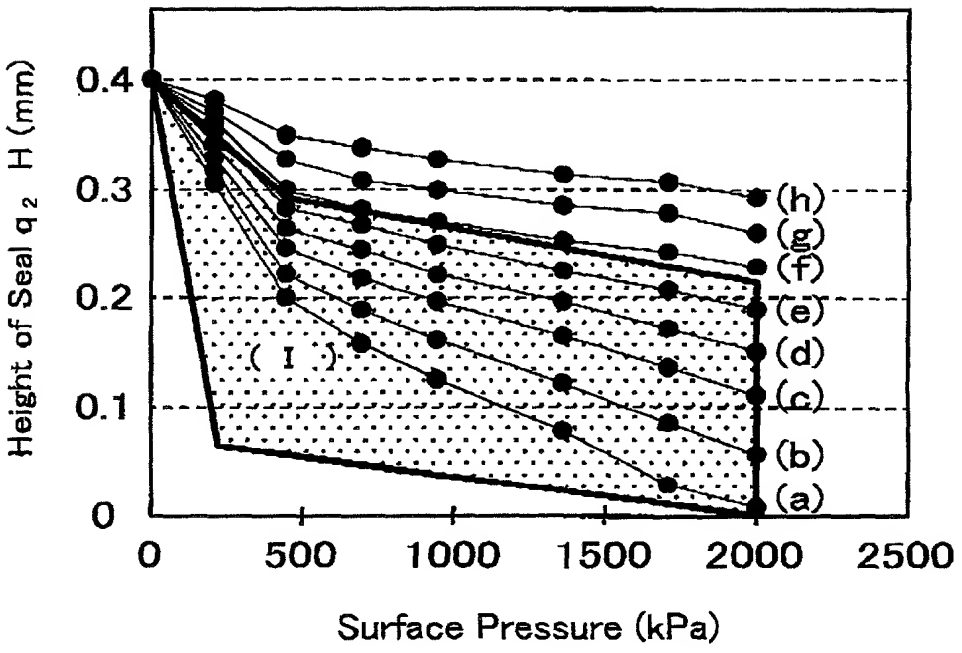
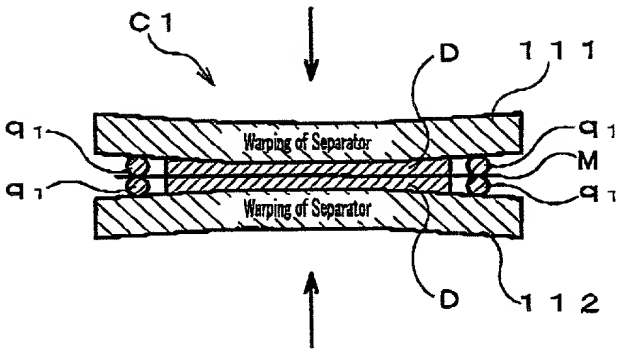
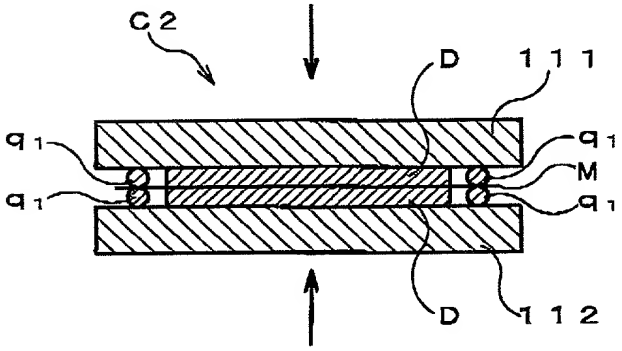

Height of Seal q_2 H (mm)
0.4
0.3
0.2
0.1
0
0
500
1000
1500
2000
2500
Surface Pressure (kPa)
(I)
(h)
(g)
(f)
(e)
(d)
(c)
(b)
(a)

FIG.19A



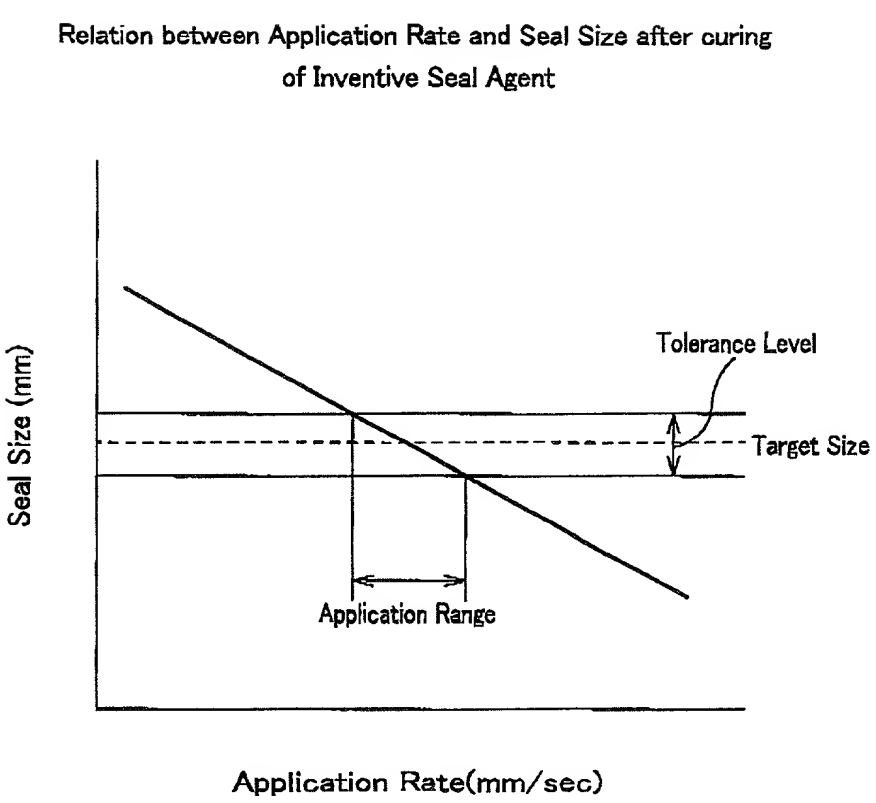
Surf. Press. α of Seal> Surf. Press. β of Diffusion Layer

FIG.19B



Surf. Press. α of Seal $\leqq$ Surf. Press. β of Diffusion Layer

FIG.20


Relation between Application Rate and Seal Size after curing of Inventive Seal Agent
Seal Size (mm)
Tolerance Level
Target Size
Application Range
Application Rate(mm/sec)